provided with at least one channel extending in a direction from one electrode to the other and terminating a predetermined point within the material, the shape of the channel at the point being adapted to increase electrical stress threat when electrical stress is applied to the material and to produce electrical breakdown of the material. As shown, Fig. 6, two three-electrode switches are connected to a central trigger switch formed between copper sheets 21 and 30. Pulse-charging connections 11, 16, Fig. 7 are taken from sheet 21 and sheet 33 respectively to a capacitor 56 which is charged by a Cockcrift-Walton generator (not shown). In operation of the generator of Fig. 7, a charging waveform is applied via connections 44 and 46 until the gap between discs 26 and 22 in the trigger switch becomes over volted and breaks down. Copper sheet 45 acts as a capacity divider to maintain the volts or disc 25 at the required fraction of the charging voltage. Upon breakdown, the voltage change on disc 26 is transmitted to discs 17 and 28, which act to short-circuit substantially simultaneously the non-output ends of sheets 18 and 9, and 40 and 33 respectively, and to generate an output pulse between the output ends of sheets 33 and 48.

988,778. Pulse generators. UNITED KINGDOM ATOMIC ENERGY AUTHORITY. Jan. 4, 1963 (Jan. 12, 1962) No. 1313/62 Heading H3P (Also in Division H1)

A millimicrosecond pulse generator comprises two transmission lines, each formed from two parallel conductive strips, the lines being charged in parallel and discharged in series. Fig. 1 shows a circuit of the Birmlein type utilizing two parallel strip transmission lines 1, 2 coupled by a third transmission line 3 to a load such as an oscillator or an X-ray tube. When switch 6 is closed, capacitor 4, charged to a voltage V is discharged via resistor R into lines 1, 2 in parallel. The voltage on lines 1, 2 builds up until a spark gap, sown as a switch 3, breaks down, driving a surge of -V from left to right along line 1. When the surge reaches the open end of line 1, it is reflected, recharging line 1 to +V. The lines 1, 2 are now connected effectively in series, hence a voltage V is now present across the matched load R1, commencing the output pulse and causing surges of -V/2 and +V/2 to be propagated along lines 1, 3. When the surges reach the left-handed end of the lines they are reflected with the result that the lines become completely discharged into the load R1 in 3 x 10^{-5} seconds. The low characteristic impedance of the strip lines, e.g. about 0-1 ohm is ~~mixed~~ used to cause the efficiency of the circuit to be much greater than that of a conventional Burmlein circuit. The spark gap S is of the type described in Specification, 988,777 (see Division H1) in which planar electrodes are separated by a sheet of polyethylene containing 50 blind holes. The sheet is replaced after each pulse. The pulse charging arrangement comprising capacitor 4 and the switch 5 may be replaced by a direct current

source. Fig. 2 shows an arrangement comprising three pulse generators of the type shown in Fig. 1 all charged in parallel and discharged in series. The folded-back foil 6 is replaced by a single foil 6A. The pulse is initiated by a breakdown of spark gaps at points X. Fig. 5 (not shown) relates to another multiple line circuit.

Fig. 4 shows a pulse generator comprising a pair of strip transmission lines formed by copper sheets 48, 8, 9 separated by a block 42 of polymothylmethacrylate. The lines are charged in parallel from a capacitor 56 charged by a Cockcrott-Walton generator (not shown) discharged into the pulse generator by lowering the sphere 53 so as to break down the spark gap 51, 52. Charging of the lines in parallel causes breakdown of three spark gap devices such as 17, 22 (of the type described in Specification 988,777) so that the lines are discharged in series as described above.

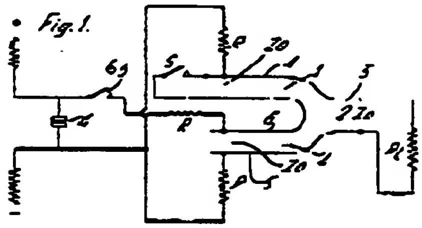
1,087,933. Pulse generating circuits. UNITED KINGDOM ATOMIC ENERGY AUTHORITY. Oct. 5, 1961 (Oct. 10, 1963) No. 39995/03. Addition to 975,911. Heading H3P

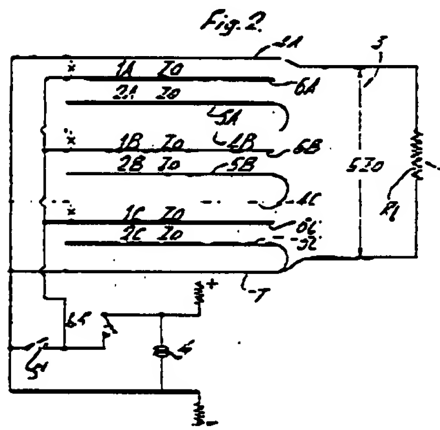
A pulse generator comprised two pairs of mutually insulated electrically conducting sheets 31, 33, 31, 33 rolled together to form two pairs of strip transmission lines, on of said pairs being located concentrically within the other and switch means (such as spark gap 26) arranged to discharge one only of each pair of strip transmission lines and generate voltage pulses between the ends of a given sheet of each pair. The two strip transmission lines may be arranged either in series as shown or in parallel as in Figs. 1, 2 (not shown). The inner and outer transmission lines may be wound in opposite directions, or as in Fig. 1 (not shown), in the same direction. The load may be connected via a further spark gap (Fig. 4, not shown) to point 27, the further spark gap being arranged to break down a the peak value of the short-duration triangular shaped, high voltage pulse generated by closing switch 26. Alternatively, the further spark gap in the load circuit may be applied to the pulse generator described in Specification 975,911, having one pair of strip lines.

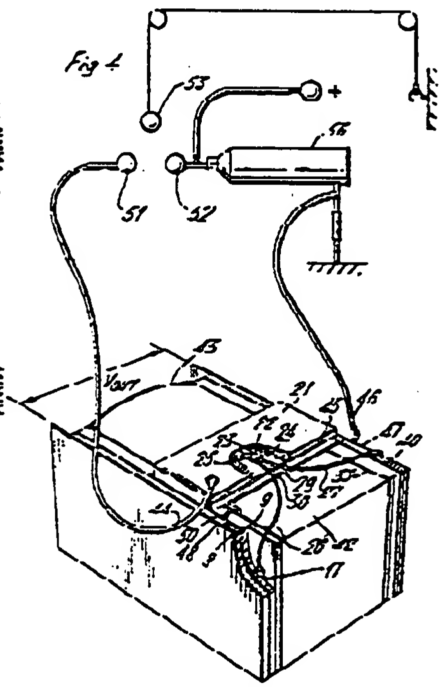
1,161,347. Pulse generating circuits. UNITED KINGDOM ATOMIC ENERGY AUTHORITY. 2 Oct. 1967 (21 Oct. 1966). No. 47424/66. Heading H3P. (Also in Division H1)

A pulse generator comprises at least one capacitive energy store comprising at least two electrodes 15, 19 having the space between them filled with a polar liquid of high dielectric constant the configurations of said electrodes being such that when a voltage is applied between them a greater electric field

988,778. Pulse generators. UNITED KINGDOM ATOMIC ENERGY AUTHORITY. Jan. 4, 1963 [Jan. 12, 1962], No. 1313/62. Heading H3P. [Also in Division H1]







A millimicrosecond pulse generator comprises two transmission lines, each formed from two parallel conductive strips, the lines being charged in parallel and discharged in series. Fig. 1 shows a circuit of the Blumlein type utilizing two parallel strip transmission lines 1, 2 coupled by a third transmission line 3 to a load such as an oscillator or an X-ray tube. When switch 5 is closed, capacitor 4, charged to a voltage V, is discharged via resistor R into lines 1, 2 in parallel. The voltage on lines 1, 2 builds up until a spark gap, shown as a switch 3, breaks down, driving a surge of −V from left to right along line 1. When the surge reaches the open end of line 1, it is reflected, recharging line 1 to +V. The lines 1, 2 are now connected effectively in series, hence a voltage V is now present across the matched load R1, commencing the output pulse and causing surges of −V/2 and +V/2 to be propagated along lines 1, 2. When the surges reach the left-handed end of the lines they are reflected with the result that the lines become completely discharged into the load R1 in 3×10^{-9} seconds. The low characteristic impedance of the strip lines, e.g. about 0·1 ohm is stated to cause the efficiency of the circuit to be much greater than that of a conventional Blumlein circuit. The spark gap S is of the type described in Specification 988,777 (see Division H1), in which planar electrodes are separated by a sheet of polyethylene containing 50 blind holes. The sheet is replaced after each pulse. The pulse charging arrangement comprising capacitor 4 and the switch 5 may be replaced by a direct current source. Fig. 2 shows an arrangement comprising three pulse generators of the type shown in Fig. 1, all charged in parallel and discharged in series. The folded-back foil 6 is replaced by a single foil 6A. The pulse is initiated by a breakdown of spark gaps at points X. Fig. 3 (not shown) relates to another multiple line circuit.

Fig. 4 shows a pulse generator comprising a pair of strip transmission lines formed by copper sheets 48, 8, 9 separated by polyethylene sheets and a further pair of strip transmission lines formed by copper sheets 47, 40, 33. The two pairs of lines are separated by a block 42 of polymethylmethacrylate. The lines are charged in parallel from a capacitor 56 charged by a Cockcroft-Walton generator (not shown), discharged into the pulse generator by lowering the sphere 53 so as to break down the spark gap 51, 52. Charging of the lines in parallel causes breakdown of three spark gap devices such as 17, 22 (of the type described in Specification 988,777) so that the lines are discharged in series as described above.